National Institute of Environmental Health Sciences

Adapting to climate change impacts on water resources in England-An assessment of draft Water Resources Management Plans

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Abstract:

Climate change is expected to produce reductions in water availability in England, potentially necessitating adaptive action by the water industry to maintain supplies. As part of Ofwat's fifth Periodic Review (PR09), water companies recently released their draft Water Resources Management Plans, setting out how each company intends to maintain the balance between the supply and demand for water over the next 25 years, following Environment Agency guidelines. This paper reviews these plans to determine company estimates of the impact of climate change on water supply relative to other resource pressures. The approaches adopted for incorporating the impact in the plans and the proposed management solutions are also identified. Climate change impacts for individual resource zones range from no reductions in deployable output to greater than 50% over the planning period. The estimated national aggregated loss of deployable output under a "core" climate scenario is ~520 Ml/d (3% of deployable output) by 2034/2035, the equivalent of the supply of one entire water company (South West Water). Climate change is the largest single driver of change in water supplies over the planning period. Over half of the climate change impact is concentrated in southern England. In extreme cases, climate change uncertainty is of the same magnitude as the change under the core scenario (up to a loss of ~475 Ml/d). 44 of the 68 resource zones with available data are estimated to have a climate change impact. In 35 of these climate change has the greatest impact although in 10 zones sustainability reductions have a greater impact. Of the overall change in downward pressure on the supply–demand balance over the planning period, ~56% is accounted for by increased demand (620 Ml/d) and supply side climate change accounts for ~37% (407 Ml/d). Climate change impacts have a cumulative impact in concert with other changing supply side reducing components increasing the national pressure on the supply–demand balance. Whilst the magnitude of climate change appears to justify its explicit consideration, it is rare that adaptation options are planned solely in response to climate change but as a suite of options to provide a resilient supply to a range of pressures (including significant demand side pressures). Supply-side measures still tend to be considered by water companies to be more reliable than demand-side measures.

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Resource Description

Communication: ☒

resource focus on research or methods on how to communicate or frame issues on climate change;

surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Policymaker

Other Communication Audience: Water companies

Exposure : ☑

weather or climate related pathway by which climate change affects health

Food/Water Security

Geographic Feature: ☑

resource focuses on specific type of geography

Freshwater

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : England

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Resilience: ☑

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☑

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content